WK 5

IOT – SH

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1. How LDR sensor is useful in Health Monitoring?

Answer: 1

Light Dependent Resistor (LDR) is used as a light detector. It works on the principle that when light falls on the resistor, its resistance changes. As the light intensity increases, the resistance decreases. Thus the voltage drop across the resistor decreases.

When human tissue is lighten up using the light source, the intensity of the light reduces. As this reduced light intensity falls on the LDR, the resistance increases and as a result of the voltage drop increases. When the voltage drop across the LDR input exceeds that of the inverting input, a logic high signal is developed at the output of the comparator and in case voltage drop being lesser a logic low output is developed. Thus the output is a series of pulses. These pulses can be fed to the Microcontroller which accordingly processes the information to get the heartbeat rate and this is displayed on the Display interfaced with the Microcontroller.

2. Name some applications where accelerometer and Gyroscope are used together? Explain how and why?

Answer: 2

There are many application where accelerometer and gyroscope used together. Some of them are

Mobile Phones

All the latest smart phones have accelerometer and gyroscope.

Accelerometers in mobile phones are used to detect the orientation of the phone.

The gyroscope, or gyro for short, adds an additional dimension to the information supplied by the accelerometer by tracking rotation or twist.

Accelerometer will measure the directional movement of a device but will not be able to resolve its lateral orientation or tilt during that movement accurately unless a gyro is there to fill in that info.

<u>Drones</u>

Accelerometers and gyroscopes are the sensors of choice for acquiring acceleration and rotational information in drones,

Gyroscope measures the rate of rotation and helps keep the drone balanced. Gyroscopes are devices that consist of a mounted wheel that spins on an axis that is free to move in any direction. They're used to provide stability or maintain a reference direction.

Accelerometer is used to measure the orientation of a drone relative to earth's surface. It works by sensing the acceleration of gravity. It is also used to give linear acceleration in horizontal and vertical direction.

3. Explain those scenarios where we need to use PIR sensor and ultrasonic sensors together?

Answer: 3

Mostly both sensors used in:

<u>Surveillance systems</u>

These sensors detect human or particle movement in a certain range i.e. ultrasonic sensor and proximity sensors sends out a sound wave and once the wave contacts an object such as human or wall, the wave bounces back to the sensor and the time which the wave has travelled forth and back is calculated to be the distance between the sensor and the object.

<u>Automatic lighting applications</u>

This device measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. So these electric signals is used to turn on or off the lights.

4. Which type of motors are used in Drones. Explain?

Answer: 4

Motors which are used in Drone are as follows:

<u>Brushless DC Motors (BLDC):</u>

A brushless motor contains a bunch of electromagnets (coils) which are connected together in specific pairs. The motor controller is the device that controls the motor by

activating and deactivating specific sections of electromagnets in the motor at very specific times to cause the rotor of the motor to spin due to the magnetic force.

Due to absence of brushes, wear and tear is very less, thus making them more reliable and durable and also there is very less heating and noise which make them more efficient.